REMARKS

Claims 1-44 stand pending in the instant application, including independent claims 1 and 23. All claims are rejected. In this response, Applicant makes no amendments to the claims. Instead, Applicant strongly believes that the independent claims and all dependent claims are in condition for immediate allowance for the reasons discussed below.

The claims are directed to an apparatus and method implemented by a mobile station for dynamically adjusting the mobile station's transmission rate on a reverse link channel. A base station periodically (e.g., once per frame) estimates the reverse link load. Based on the current load at the base station, the base station sends rate control commands to a group of mobile stations. Typically, the base station sends a "1" to instruct the mobile stations to increase their data rate and sends a "0" to instruct the mobile stations to decrease their data rate. With common rate control, a single rate control command is sent to a group of mobile stations. Thus, all mobile stations in the group will increase or decrease their data rates in unison with one another, resulting in large fluctuations in load at the base station.

The present invention avoids large fluctuations in load at the base station by using a probabilistic rate change mechanism. The rate control commands are interpreted as load indications by the mobile station. The mobile stations calculate a load tracking value by filtering these rate control commands (load indications). The load tracking value is then used by the mobile stations to determine a rate change probability. The rate change probability computed at each mobile station determines the probability that it will change its data transmission rate in the current evaluation period responsive to the rate control command/load indication. For example, if the rate change probability is .66, then two-thirds of the mobile stations in the group will increase their data rate responsive to a "1." As a result, some of the mobile stations will change rates while other mobile stations will continue to transmit at their current rate.

Independent claims 1 and 23 were rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,999,425 (hereinafter Cheng) in view of U.S. Patent Publication No. 2002/0141349 (hereinafter Kim) and in view of U.S. Patent Publication No. 2005/0105604 (hereinafter Ito). Cheng describes a method implemented at a base station to control the transmission rate of mobile terminals. In Cheng, the base station itself uses load estimates to calculate a maximum transmission rate limit for each mobile station. For example, the base station obtains reverse link load estimates by "adding together the data rate transmitted from each active mobile" transmitting on the reverse link. See Cheng, col. 5, lines 6-9. These load estimates are filtered, normalized, and compared with a set of thresholds to obtain the maximum rate limit (e.g., 76.8 kbps) that is set for each mobile station. Presumably, the base station transmits this maximum rate limit to all mobile stations. The mobile stations then autonomously determine if an increase or decrease in rate is necessary to comply with the maximum rate limit set by the base station.

Kim, however, discloses an entirely different approach to controlling the transmission rate of mobile stations. In the cited portion of Kim, the base station transmits load messages to the mobile stations over the Reverse Activity channel. These load messages contain, for example, reverse activity bits indicating whether the reverse link load is large or small. See Kim, paragraph 0020. In response to these load messages, the mobile stations change their data rate (e.g., if the link load is large, the mobile stations decrease their data rate by ½).

Ito discloses a bit rate control method to suppress fluctuations in the transmission rate of mobile stations. Ito's rate control method first establishes a plurality of preset discrete bit rates at which any one mobile station can transmit. A target bit rate is then determined which represents the desired average bit rate of all mobile stations (based on, for example, packet loss ratio and round trip time). The probability that the transmission bit rate of each mobile station will change from one discrete bit rate to another is determined based on how close that

mobile station's current transmission bit rate is to the target bit rate. If the current and target bit rates are close, then the probability that the mobile station's bit rate will remain at the current bit rate is high. As the current bit rate deviates further from the target bit rate, the probability that the mobile station's bit rate will remain at the current bit rate is lowered, and the bit rate is set to a different discrete bit rate. Thus, the overall average bit rate of all the mobile stations is close to the target bit rate.

Claim 1 is directed to a method implemented by a mobile station for adjusting the transmission rate of the mobile station. Claim 1 includes the limitation that the mobile station "calculate[es] a load tracking value based on two or more periodic load indications." Cheng fails to disclose this limitation. As noted above, any calculations of load estimates in Cheng are computed by the base station. In fact, the mobile stations in Cheng perform no such calculations because, as the Examiner admits, the mobile stations never receive the periodic load indications on which the calculations are based. Because no other reference cures the deficiencies of Cheng, the Examiner's obviousness rejection of claim 1 must be withdrawn for at least the reason that all references fail to disclose this limitation.

Furthermore, Cheng's deficiencies highlight the reason why it would not have been obvious, or useful, for a person having ordinary skill in the art to combine Cheng and Kim. Modifying Cheng to have its mobile units receive the load messages of Kim would not enhance the ability of Cheng's base station to calculate load estimates. Yet further modifying Cheng to have its mobile units calculate load estimates based on Kim's load messages would render Cheng unsatisfactory for its intended purpose. In fact, Cheng's load estimate calculations are based on load values (e.g., aggregated data rates of all mobile stations) that are only obtainable by the base station, and in any event, are entirely different than Kim's load messages (e.g., reverse activity bits). Contrary to the Examiner's contention, then, such a modification would never be motivated for the "improve[d] performance of the system." Rather, such modification

amounts to impermissible hindsight and is contrary to the teachings of Cheng and Kim. Thus, even assuming *arguendo* that Cheng disclosed the above limitation, the Examiner's obvious rejection of claim 1 must be withdrawn for the additional reason that no reason exists for the combination of Cheng and Kim.

Claim 1 further recites "determining a rate change probability as a function of the load tracking value." Neither Cheng, Kim, or Ito disclose this limitation alone. Particularly with regard to Ito, Ito discloses a probability related to the change in bit rate, but that probability is a function of the difference value between the current bit rate and a target bit rate. Furthermore, combining Ito with Cheng fails to remedy Ito's deficiency. As an initial matter, Cheng's load estimates are not a simple substitute for Ito's difference value. In fact, Cheng's load estimates amount to a percentage of total load utilization while Ito's difference value amounts to an error value for maximizing the quality of service of a current load utilization. See Ito, paragraph 0020. Such a substitution would, therefore, yield unpredictable results. Yet even assuming *arguendo* the feasibility of such substitution as suggested by the Examiner, modifying Ito so that Ito's probability depends on Cheng's load estimates utilizes Cheng's load estimates to perform a different function. Specifically, Cheng teaches comparing load estimates to threshold values for selecting a rate limit (e.g., 76.8 kbps) above which the transmission rate could not change. Ito as modified, however, would utilize Cheng's load estimates for determining the probability (e.g., 76.8 %) that the transmission rate would change. Because the combination of Cheng and Ito would yield unpredictable results and utilize elements differently than when separate, the Examiner's obviousness rejection of claim 1 must be withdrawn.

Finally, claim 1 recites "selectively changing the transmission rate of the mobile station responsive to a current rate control command based on the rate change probability." As discussed above, neither Cheng nor Ito, alone or in combination, disclose determining a rate

change probability as a function of the load tracking value. Therefore, Ito cannot then disclose changing the transmission rate based on the rate change probability.

As noted above, neither Cheng, Kim, or Ito, teach or suggest all of the limitations of independent claim 1. Therefore, the combination of Cheng, Kim, and Ito fail to establish a *prima facie* case of obviousness, and the rejection of claim 1 must fail as a matter of law. Thus, independent claim 1 and dependent claims 2-7, 12-19, 21, and 22 are not made obvious by Cheng, Kim, and Ito and are in condition for allowance.

Claim 23 is directed to a mobile station that practices the method set forth in claim 1. Claim 23 recites a controller of the mobile station is configured to "calculate a load tracking value based on two or more periodic load indications." As discussed above, Cheng cannot be used to disclose such limitation because Cheng relates to a controller of the base station. Moreover, Cheng, Kim, and Ito are not combinable for the reasons noted above. For at least these reasons, independent claim 23 and dependent claims 24-29, 34-41, 43, and 44 are not made obvious by Cheng, Kim, or Ito and are in condition for allowance.

Claims 8-11 and 30-33 were rejected under 35 U.S.C. 103(a) as being unpatentable over Cheng in view of Ito, in further view of U.S. Patent No. 6,490,460. Dependent claims 8-11 are patentable for at least the reasons stated above for independent claim 1. Dependent claims 30-33 are patentable for at least the same reasons stated above for independent claim 23.

Claims 20 and 42 were rejected under 35 U.S.C. 103(a) as being unpatentable over Cheng in view of Ito, in further view of U.S. Patent No. 6,397,070. Dependent claim 20 is patentable for at least the reasons stated above for independent claim 1. Dependent claim 42 is patentable for at least the same reasons stated above for independent claim 23.

In light of the above arguments, Applicant believes that all pending claims (1-44) stand in condition for immediate allowance and respectfully requests reconsideration as such by the Examiner. Further, if the Examiner has any questions or concerns regarding this response, or

any other issue related to the instant application, the Examiner is encouraged to call the undersigned attorney.

Respectfully submitted,

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